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STATEMENT IN REGARD TO THE KINGS RIVER
WATER POWER PROJECTS AND THE PROPOSED
ROOSEVELT-SEQUOIA NATIONAL PARK BY
DESMOND FITZGERALD AND FREDERICK LAW OLMSTED

TO THE FEDERAL POWER COMMISSION

November 30, 1921

The undersigned, Desmond Fitzgerald, hydraulic engineer, and Frederick Law Olmsted, landscape architect, acting as private citizens and on their own initiative, made an investigation in the field during July and August, 1921, of portions of the watershed of the Kings River, California, and of the projects for water power development on the South and Middle Forks therein which are now under consideration by the Federal Water Power Commission*; for the purpose of forming an opinion on the public expediency of those projects and their relation to the bill now before Congress (H.R. 7542) providing for the inclusion of the South and Middle Forks of Kings River in the Roosevelt-Sequoia National Park.

POINT OF VIEW OF THE INVESTIGATION:

We were led to undertake the investigation because we had been asked to express opinions in regard to the pending applications for permits, and had found ourselves unable to form a just opinion from such meager information, largely from prejudiced sources, as was then accessible to the public. We were aware of sharp differences of opinion as to whether the Federal Water Power Commission ought to grant permits for the water power projects in question and we appreciated both the great importance of providing for the maximum reasonably attainable economic use of the waters of the Sierra and also the great potential value of that part of the Sierra as a place of recreation for the people of the United States.

NATURE OF THE INVESTIGATION:

We interviewed the responsible engineers and other representatives of the City of Los Angeles, of the San Joaquin Light and Power Company, of the Southern California Edison Company, and of two of the principal groups of irrigators using the water of the Kings River, and also the Forester of the United States and the Director and other officials of the National Parks Service; to all of whom we are indebted for a

* Applications of the City of Los Angeles and of the San Joaquin Light and Power Company.

great deal of information, reports, maps, plans and other data freely put at our disposal, and for many courtesies which facilitated our investigation in the field. We spent ten days with pack train on the South and Middle Forks of the Kings River and their drainage area, and some weeks additional in examining existing and projected power developments elsewhere in the Sierra and the condition and manner of use of the National Parks and National Forests in that region. We have since interviewed representatives of the Sierra Club of California, the chief proponent of the Roosevelt-Sequoia National Park.

PRINCIPAL INTERESTS INVOLVED:

The only interests of large importance to be considered in dealing with this region from a national standpoint appear to be the use of the water for irrigation and power-development and the use of the region for recreation. Lumbering, grazing and mining possibilities are practically negligible owing to the small amount and relative inaccessibility of merchantable timber, grazing land and minerals.

IRRIGATION:

In common with other streams flowing westward out of the Sierra, the primary economic value of the Kings River is for irrigation. Agricultural irrigation is the basic source of wealth and prosperity for this part of California, the supply of water from all possible sources is insufficient to irrigate all the fertile lands otherwise available, and in no part of the country, broadly speaking, can the application of labor to land add more to the national production of wealth, especially in foods, than on the irrigated lands where these streams debouch upon the plain. Without irrigation they produce practically nothing. Clearly all the water of the Kings River which can be effectively used for irrigation ought to be so used.

Disregarding minor inefficiencies of method, gradually in course of correction, practically all of it is so used at present throughout the irrigation season except during short periods at the peak of floods, when the natural flow exceeds the irrigation capacity and the surplus runs to waste. There is also some waste during the late autumn and early winter months when there is no irrigation, the stream-flow being small at that season. It is of primary economic importance, then, to secure a more complete and efficient use of the water by constructing and operating storage

reservoirs within reasonable limits of cost, so as to equalize the rate of outflow of the river as nearly as possible, day by day, with the seasonal demand for irrigation water.

HYDRO-ELECTRIC POWER:

Also in common with the other large streams of the westerly slope of the Sierra, the Kings River appears to present notable opportunities for the development of hydro-electric power above the point where water can be diverted for irrigation, and there is a large existing and potential demand for the useful employment of such power. Locally, in the great Interior Valley, radiating from Fresno and the Kings River, the present demand for power exceeds the present supply, and there appears to be a very large potential demand for power, especially for pumping ground-waters in a doubly useful process of underdrainage and irrigation.

There is also a large present and potential demand for power for industrial and other purposes within transmission distance of the Kings River, especially in the Los Angeles district.

POINT OF CONFLICT BETWEEN REQUIREMENTS FOR IRRIGATION AND FOR POWER:

Since any water used for developing power would be returned to the stream above the points where water is diverted for irrigation, the real point of conflict between these two economic uses is simply in regard to the control of fluctuations in the natural rate of flow by means of storage reservoirs.

Broadly speaking, from the irrigation standpoint it is desirable by the use of storage reservoirs to shut off all outflow from the river in the late autumn and early winter months and to release the entire annual flow during the irrigation season, beginning with small quantities in the latter part of the winter, increasing rapidly in the spring to a maximum in June and July, and then diminishing to nothing in the autumn.

For power plants serving ordinary domestic, municipal and industrial uses the demand is for a flow more nearly equal, month by month, throughout the year. Almost any regulation of the flow of Kings River exclusively in the interest of power production, (except seasonal power production coincident with the demand for irrigation water,

reservoirs within reasonable limits of cost, so as to
control the flow of the river and thereby
control the flow of the river, with the essential demand for irrigation
water.

WATER RESOURCES POWER

Water is abundant in the upper reaches of the
river, the lower reaches being subject to
frequent floods. The development of water
resources above the point where water can be diverted
for irrigation, and there is a large existing and potential
demand for the local employment of such power. Locally, in
the great Indian Valley, the river flows through the
great river, the great demand for power exists. The present
supply and demand appear to be a very large potential demand
for power, especially for power for irrigation and for
local power of manufacturing and domestic.

There is also a large demand and potential demand for
power for industrial and other purposes within the
vicinity of the river, especially in the lower reaches
of the river.

POINT OF CONTROL BETWEEN RESOURCES AND IRRIGATION AND POWER

Since any water used for developing power would be
returned to the stream above the point where water is
diverted for irrigation, the real point of control between
the two systems is the point where water is diverted to the control
of irrigation in the lower reaches of the river by means of
the reservoir.

Recently, the river, from the first station above the
reservoir to the end of the reservoir, to about 100
miles from the river in the lower reaches and during the
months and years the water is diverted to the
irrigation system, leaving the river in the lower
reaches of the river, increasing rapidly in the spring
as a result of the rain and then distributed to
nothing in the winter.

For power plants serving ordinary domestic, municipal
and industrial uses the demand is for a flow more nearly
equal month by month, throughout the year. Almost any
regulation of the flow of the river is necessary in the
interest of power production, for the seasonal power
the action coincident with the demand for irrigation water.

as for use in pumping ground-waters) would adversely affect the interests of irrigators and thus the basic economic values of the region, and the presumption is clearly against permitting such regulation. Fortunately, however, it is possible from an engineering standpoint, and probably without prohibitive cost, to construct a storage reservoir, with a capacity of some 600,000 acre-feet, on the Kings River at Pine Flats in the foot-hill region, between the power-sites on the steep portions of the watershed and the points where water is diverted for irrigation, and therefore to regulate the flow of the river in the interests of irrigation.

Such a reservoir would greatly increase the completeness and efficiency of utilization of the water for irrigation, irrespective of any power developments above, and would have no effect whatever on the use of the mountainous region for purposes of recreation.

But it also appears to be true, from a study of the actual records of stream flow over a period of twenty-six years, that if such a compensating reservoir is built the effect of additional reservoirs on the upper portions of the watershed, even though operated as power-reservoirs with a view to equalizing the flow locally for power purposes throughout the twelve months of the year, would be to increase still further the possibilities of effective use for irrigation below Pine Flats.

It remains true, nevertheless, that in so far as power derived from the waters of Kings River is generated to meet seasonal demands which are coincident in time with the demand for irrigation water (as in pumping the ground-waters of the Interior Valley), instead of being generated to meet demands which are uniform throughout the twelve months, a more complete and efficient use can be made of the water for the combined purposes of irrigation and power with a given total investment in storage reservoirs.

COMPARISON OF POWER DEMANDS FROM THE LOS ANGELES AND THE FRESNO DISTRICTS:

As between the two principal groups of potential users of power derivable from the Kings River, those in the district around Fresno and those in the district around Los Angeles, two important differences are to be noted.

as far as in pumping (pumps) would necessarily affect the interests of irrigation and thus the basic economic values of the region, and the proposition is clearly against irrigation such as is being proposed. However, even if it is possible to find an engineering arrangement, probably without prohibitive cost, to construct a storage reservoir with a capacity of some 500,000 acre-feet on the Kings River, this plan is in the long-run, a waste of money. It is a waste of money because the water shed and the points where water is diverted for irrigation and therefore to some extent the line of the river in the interests of irrigation.

Such a reservoir would greatly increase the water available and efficiency of utilization of the water for irrigation, irrespective of any power developments above and would have no effect whatever on the use of the downstream region for purposes of recreation.

But it also appears to be true, from a study of the actual records of stream flow over a period of twenty-six years, that if such a compensating reservoir is built the effect of additional reservoirs on the upper portions of the watershed, even though operated as power-reservoirs with a view to equalizing the flow locally for power purposes throughout the twelve months of the year, would be to increase still further the possibilities of effective use of the irrigation below Kings River.

It remains true, nevertheless, that as far as power derived from the waters of Kings River is concerned, to meet seasonal demands and to provide a steady flow with the demand for irrigation water (as in pumping the water) of the irrigation valley, instead of being generated to meet demands which are met throughout the twelve months, a more complete and efficient use can be made of the water for the combined purposes of irrigation and power with a given total investment in storage reservoirs.

COMPARISON OF POWER DERIVED FROM THE TWO AREAS AND THE THERMO DISTRICT

As between the two principal groups of potential users of power derivable from the Kings River, there is the district around Fresno and those in the district around Los Angeles, two important differences are to be noted.

First, the demand from the Los Angeles district is mainly urban and industrial and therefore substantially continuous throughout the year; whereas the demand from the Fresno district is increasingly for use in pumping irrigation water and is therefore seasonal, its peak coinciding with the peak of the demand for the release of water for direct use in irrigation and substantially coincident with the peak of the natural seasonal discharge from the drainage area. Other things being equal, it is obvious that it would require less storage capacity and less expense to combine this seasonal demand from the Fresno district for the release of water for power purposes with the primary seasonal requirement for irrigation water in that district than it would to combine with the latter a substantially uniform demand for power such as that from the Los Angeles industrial district.

Second, the Los Angeles district is much nearer than the Fresno district to the largest undeveloped source of power in the west, the Colorado River; so that if there is to be an allocation of the two power sources as between these two districts it would be more reasonable to draw power for the Los Angeles district from the Colorado and for the Fresno district from the Kings River at its very doors than the reverse. This consideration should obviously be modified by regard for the immediacy of the demand and by regard for the economy of first developing those sources of power which can be most economically developed. The immediate power demands from the Los Angeles district are apparently much larger than those from the Fresno district, but both are apparently much in excess of the supply and rapidly increasing.

We are not in a position to express an independent opinion on the relative economy of developing power from the Colorado and from the Kings River, but we note that the engineers both of the City of Los Angeles and of the Southern California Edison Company, while differing radically about many things, are agreed in estimating that power can be delivered in Los Angeles from the Colorado River at the remarkably low figure of six tenths of a cent or less per kilowatt-hour, wholesale.

It is also to be noted that the initial overhead expense of any project for developing power on the Colorado River and transmitting it to California is very great, and that the possibility of keeping down the cost of such power per kilowatt-hour to a reasonably low figure would be dependent on securing promptly a large market for the power so transmitted.

First, the demand from the Los Angeles district is nearly constant and therefore substantially constant throughout the year, whereas the demand from the Colorado district is substantially low and in passing irregular water and is therefore seasonal. It is not surprising that the cost of the demand for the release of water for direct use in irrigation and consequently consistent with the cost of the water and cost of the release of water from the Colorado district being lower, it is obvious that it would require less storage capacity and less expense to combine this seasonal demand from the Colorado district for the release of water for power purposes with the primary seasonal requirement for irrigation water in that district than it would to combine with the latter a substantially constant demand for power and as that from the Los Angeles industrial district.

Second, the Los Angeles district is much nearer the Colorado district to the largest undeveloped source of power in the west, the Colorado River; so that it is more to be an allocation of the power between these two districts it would be more reasonable to draw power for the Los Angeles district from the Colorado and for the Colorado district from the Kings River at the very least than the reverse. This consideration should obviously be modified by regard for the immediacy of the demand and by regard for the economy of first developing those sources of power which can be most economically developed. The immediate power demands from the Los Angeles district are apparently much larger than those from the Colorado district, but both are apparently upon an excess of capacity and rapidly increasing.

It was not in a position to express an independent opinion on the relative economy of developing power from the Colorado and from the Kings River, but we note that the nearest part of the City of Los Angeles and of the Southern California Edison Company, while differing radically in many things, are agreed in estimating that power can be delivered in Los Angeles from the Colorado River at the remarkably low figure of six tenths of a cent per kilowatt-hour.

It is also to be noted that the initial overhead expense of any project for developing power on the Colorado River and transmitting it to California is very great, and that the possibility of keeping down the cost of such power by means of a reasonably low figure would be dependent on securing promptly a large market for the power as transmitted.

These considerations seem to point toward the conclusion that if any Colorado River development is to be undertaken in the near future the power demands from the Los Angeles district should be concentrated as far as practicable upon that source, and that any developments on the Kings River should either be postponed or assigned to meeting the neighboring demands of the Fresno district, which are seasonally better adjusted to the hydrographic conditions of that watershed and to the requirements of the irrigators for the seasonal regulation of the flow.

RELATION OF PROPOSED POWER DEVELOPMENTS ON THE KINGS RIVER TO THE SCENERY AND TO THE PROPOSED ROOSEVELT-SEQUOIA NATIONAL PARK:

The canyons of the South and Middle Forks of Kings River are among the most notable and most beautiful examples of wild scenery in the world. Comparisons in such matters are difficult and often misleading, but it can be said that they are of the general type of which the Yosemite Valley is the most famous example. Certainly the writers, in their extensive travels, have seen nothing else of that type in the same class with these canyons and the Yosemite.

Furthermore, portions of these canyons constitute natural routes of entrance, indeed the most impressive and beautiful of all such routes, into the region of the High Sierra. This is one of the grandest regions of wild mountain scenery in the country. Probably in no other region of equal extent would the permanent exclusion of commercial exploitation secure so large an opportunity for people to enjoy the spaciousness of mountain wilderness with so small a sacrifice of other economic values. Few thoughtful people will deny the value of retaining some such great and spacious remnant of wholly uncivilized wilderness, where there shall be no evidence of man's activity beyond such inconspicuous man-made things as might have occurred in the wilderness thousands of years ago, trails, crude bridges, tents or shelter-huts. If anywhere in the United States such a purpose can be attained for all future generations without an unreasonable sacrifice of other values, it is probably in the High Sierra, where it is penetrated by the canyons of the Kings River leading up toward the Muir Trail and Mount Whitney.

It is with a view to such permanent preservation of this great mountain wilderness as a national recreation ground that the Sierra Club of California, the Director of

These considerations seem to point toward the conclusion that in any United States development it is to be undertaken in the near future the power demands from the Los Angeles district should be considered as far as possible upon that same basis, and that any development on the Kings River should either be postponed or abandoned, leaving the hydroelectric demands of the Fresno district, which are essentially better suited to the hydroelectric conditions of that watershed and to the requirements of the Kings River for a seasonal regulation of the flow.

RELATION OF PROPOSED POWER DEVELOPMENT ON THE KINGS RIVER TO THE SCIENTIFIC AND THE PROPOSED ROOSEVELT-BENJAMIN NATIONAL PARK

The scenery of the south and middle forks of Kings River among the most notable and most beautiful examples of wild scenery in the world. Comparisons in such matters are difficult and often misleading, but it can be said that they are of the general type of which the Yosemite Valley is the most famous example. Certainly the waters, in their extensive travels, have been nothing else of that type in the same class with those canyons and the Yosemite. Furthermore, portions of these canyons contain some of the most of entrance, indeed the most impressive and beautiful of all such portions, into the region of the High Sierra. This is one of the grandest regions of wild mountain scenery in the country. Probably in no other region of equal extent would the permanent enjoyment of some of the most beautiful scenery be so large an opportunity for people to enjoy the appearance of mountain wilderness with so small a sacrifice of other economic values. Yet thoughtful people will deny the value of retaining some such great and important remnants of wholly unutilized wilderness, where there shall be no evidence of man's activity beyond such inconspicuous man-made things as might have occurred in the wilderness thousands of years ago, trails, stone bridges, camps or other things. If anywhere in the United States such a good can be obtained for all future generations without an unreasonable sacrifice of other values, it is probably in the High Sierra, where it is protected by the canyons of the Kings River leading up toward the High Sierra and Mount Whitney.

It is with a view to such permanent preservation of this great mountain wilderness as a national reservation that the Sierra Club of California, the Director of

the National Parks Service, and others, have urged the establishment of the proposed Roosevelt-Sequoia National Park. It is urged on its own merits as a means of public recreation; but it is also regarded as an appropriate memorial of one who taught us by precept and example, first to work with all our might when we work, meeting squarely our obligations as citizens in a complex civilization, and second, to find refreshment from the strain of such work in the primitive pleasures of the wilderness.

It was with profound appreciation of the value of permanently keeping such a real mountain wilderness for the enjoyment of the people of the United States, and at the same time with a sane recognition of the economic importance of hydro-electric power for the people of California and of the engineering and financial requirements in its development, that we undertook our field examination.

In considering the relations of power projects to recreation values in this region, certain points need to be clearly understood.

First. The mere fact of constructing and operating a hydro-electric plant is not necessarily inconsistent with public enjoyment of the scenery in which the plant occurs. Frequently in the construction of such a plant convenient means of access is provided to notable scenery, thus enabling more people to see it than otherwise would do so. Sometimes the construction of such a plant adds new elements of landscape beauty and facilities for recreation, as in the case of certain artificial lakes made for storage reservoirs.

Second. It is generally true, however, that some of the elements of large hydro-electric plants are conspicuously inharmonious with the surrounding landscape and detract greatly from its natural beauty. This is notably apt to be the case with the high-tension transmission lines, with their tall skeleton towers and suspended wires set in a wide swath of cleared ground sliced for mile after mile through the natural landscape. It is also apt to be the case around the shores of the reservoirs, because of their widely fluctuating water level. It is often true of other elements.

The National Labor Service, and others, have urged the establishment of the proposed National Labor Service. It is urged on its own merits as a means of public recreation, but it is also regarded as an important means of one of the things as by process and example, first, to work with all our might when we work, meeting honestly our obligations as citizens in a complex civilization, and second, to find satisfaction from the simple of work in the primitive pleasures of the wilderness.

It was with profound appreciation of the value of permanently keeping such a real mountain wilderness for the enjoyment of the people of the United States, and at the same time with a sane recognition of the economic importance of hydro-electric power for the people of California and the nation, and financial considerations in its development, that we introduced our bill.

In introducing the bill, I pointed out that the recreation values in this region, certain points need to be clearly understood.

First. The more fact of maintaining and operating a hydro-electric plant is not necessarily inconsistent with public enjoyment of the country in which the plant is located. In the construction of such a plant, however, means of access to the public are provided to the extent of making them people to see it, rather than others who would be excluded. The construction of such a plant adds to the scenic of landscape beauty and facilities for recreation, as in the case of certain artificial lakes made for other purposes.

Second. It is generally true, however, that some of the elements of large hydro-electric plants are conspicuous by contrast with the surrounding landscape and extend exactly from its natural beauty. This is usually not the case with the high-tension transmission lines, with their tall slender towers and suspended wires set in a wide swath of cleared ground along for miles either side through the better landscape. It is also not the case that extend the spread of the reservoirs, ponds or their hydro-electric power levels. It is often true of other elements.

Third. Where the controlling policy in the administration of a body of public lands is to secure the maximum net return, in the long run, from any and all uses to which it can be put effectively, as is the case with the National Forests, the principle which should guide the Government in case of recreation values and power values is clearly this: If the probable net values to be obtained from a power development exceed the probable net loss in recreation values due to its installation, the power development ought to be installed; and vice versa. The net value of a power installation is the capitalized value of the amount by which the annual value of the power exceeds the annual cost for operation, for interest on first cost, for depreciation, for obsolescence, and for other proper charges.

Fourth. In the case of National Parks a different principle applies. The policy governing the proper administration of these areas is not, like that of the National Forests, to secure the maximum net return from any and all uses to which they can be put, but to preserve for all time a few supreme examples of wild natural scenery, where the public can enjoy, at their best, those kinds of recreation which can be perfectly attained only in large areas completely free from the intrusion of inharmonious and distracting elements. These areas, if properly selected, have a real and permanent value, which can be secured only by paying the price of permanently excluding from them all uses which are inconsistent, in any degree whatever, with their primary purpose. It is the duty of Congress to weigh this price against the probable value of a proposed National Park before establishing it and fixing its boundaries. When a decision has been reached and such a Park has been established, consistent adherence to the exclusive purposes for which it was set apart is essential. A compromising or vacillating policy gets neither one set of values nor the other.

If a National Park is worth having at all it should not be open to power developments any more than it should be open to commercial development for industrial or agricultural purposes. If the land ought to be used for power development it should not be made into a National Park, but should remain in a National Forest.

Table. Where the controlling policy in the main-
tenance of a body of public lands is to secure the
maximum use of them, in the long run, then any and all
uses to which it can be put effectively, as in the case
with the National Forests, the principle which should
guide the Government in cases of reclamation, water and
power values is clearly this: If the probable net values
to be obtained from a water development exceed the prob-
able net loss in reclamation values due to the installation
of the power development, then the power development should
be installed. The net value of a power installation as the difference
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If a National Park is worth having at all it should
not be open to other developments any more than it should
be open to commercial development for industrial or agri-
cultural purposes. In the last resort, the need for power
development is should not be made into a National Park,
but should remain in a National Forest.

It is for Congress to determine what areas, if any, not now included within National Parks ought to be so included, having in view their potential value for National Park purposes and the probable economic price of reserving them for such purposes. In view of the pending legislation we believe the proper action for the Federal Power Commission is, first, for the time being to withhold permits for water power developments within the limits of the proposed National Park, and second, to furnish Congress with reliable estimates of the net economic value of the several proposed water power developments within it.

Opinions of competent engineers have been cited to us, based, however, upon very incomplete information, to the effect that the cost of constructing the proposed power developments would probably be so great that their net economic value would be very slight, possibly a negative quantity. The surveys made during the past summer by the City of Los Angeles and others, and now presumably available to the Federal Power Commission, with or without additional information to be obtained by borings at the proposed dam sites, should provide a basis for reliable estimates of cost and net economic value. On the basis of such estimates, and only on the basis of such estimates, can Congress safely judge the economic price which would have to be paid for permanently withholding from power developments the area included within the boundaries of the proposed Roosevelt-Sequoia Park or within any modification of those boundaries.

Our own examination of the matter leads us to believe, for example, that where the proposed boundary runs through the site of the proposed Junction Reservoir it could logically be diverted so as to exclude at least the whole of that reservoir site without impairing the value of the park in the least, and that it should be so diverted if that power has any real net economic value. Similarly we believe that the proposed Cedar Grove Reservoir site might be excluded from the Park and developed for power purposes with comparatively small loss of park values in case that project has any real net economic value.

Any further withdrawal of the proposed park boundaries or the development of any other of the proposed power projects would clearly involve large sacrifices of recreational value, and clearly ought to be determined only on the basis of deliberately balancing net values of one kind against net values of the other kind.

Frankly the undersigned, in the absence of such estimates of cost and value of the proposed power developments as the Federal Power Commission can now make, are unwilling to stake their professional reputations on an opinion as to where the line should be drawn in the best interests of the people of the United States. We can only point out this: that to withhold permits for water power developments in the disputed territory will leave the question open for future determination at any time with a more complete understanding of all the values involved, whereas the issuance of permits would settle the question for all time. So long as the Canyons of the Kings River are held in a natural state, the power possibilities will remain available for use; but if and when vast expenditures are made in damming them and in building conduits, tunnels, power houses and transmission lines, radical and irrevocable injury will have been done to the recreation values at the very heart of one of the few regions in the country supremely valuable for the purposes of a great National Park.

It may, or it may not, be worth the economic price which would have to be paid for its permanent reservation, but the Nation ought to make up its mind deliberately that it cannot afford to pay the price of such permanent reservation before the matter is settled out of hand.

Respectfully submitted,

(Signed) Desmond FitzGerald

(Signed) Frederick Law Olmsted.

